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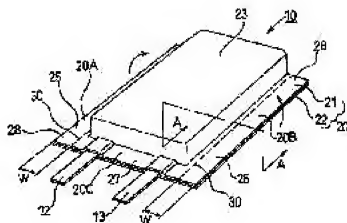
(21)Application number : **2001-121243** (71) **YUASA CORP**
(22)Date of filing : **19.04.2001** (72)Inventor : **ITAGAKI TAKAHIRO**

(54) **SEALED BATTERY**

(57)Abstract:

PROBLEM TO BE SOLVED: To make a fusing margin folded surely from a desired position.

SOLUTION: This sealed battery 10 is provided with a power generation element 11 provided with metal foils serving as a positive electrode and a negative electrode via a separator, a sealed battery package 20 for storage-sealing the generation element 11, and the fusing margins 25, 26 having a prescribed width W provided in a peripheral edge of the package 20 to surround the generation element 11, and has cut depth parts 30 formed along longitudinal directions of the fusing margins 25, 26. The cut depth part 30 is formed not to be penetrated along thickness directions of the fusing margins 25, 26 through the margins 25, 26.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]The weld cost which this invention required for the sealed type cell, especially was provided in the periphery of the package for sealed type cells is related with the sealed type cell which carries out accommodation closure of the power generation element.

[0002]

[Description of the Prior Art]In recent years, the small weight saving of the general user-oriented portable electronic device is progressing by big progress of electronic art. And since the demand of the small weight saving is increasing also to the cell, the sealed battery is used abundantly. Generally, a sealed type cell forms the power generation element possessing the metallic foil which serves as a negative electrode and an anode via a separator, and carries out accommodation closure of this power generation element with the package for sealed type cells.

[0003]By the way, when carrying out accommodation closure of the power generation element with the package for sealed type cells. After forming beforehand the hollow (namely, seat part) corresponding to the shape of the power generation element in the metal resin compound film formed in rectangular shape and arranging a power generation element to this seat part, a metal resin compound film is folded in two and a power generation element is put.

[0004]Next, weld nature resin layers are made to weld, weld cost is formed, heating three sides of a metal resin compound film, and a sealed type cell is manufactured. By bending weld cost along the side of a seat part, such a sealed type cell loses an overhang of weld cost, and its volume efficiency is improving.

[0005]Generally, when the internal pressure of the package for sealed type cells rises too much by a surcharge or overdischarge, in order to prevent expansion of a package, a burst, etc., the explosion-proof part is provided in the sealed type cell. As a sealed type cell by which the explosion-proof part was provided, JP,11-312505,A is known, for example (conventional example). As this conventional example is shown in drawing 6, perforation form infeed 51 and infeed 52 grade are formed in the package 50 for sealed type cells. And when the internal pressure of the package 50 for sealed type cells rises too much, the infeed 51 (or infeed 52) is damaged, and the package 50 for sealed type cells cleaves to a line, and works as a safety valve.

[0006]

[Problem(s) to be Solved by the Invention]By the way, in bending the weld cost 55, in order to improve

volume efficiency, as shown in drawing 7 (A), it is desirable [the sealed type cell shown in drawing 6] to bend in the direction of an arrow bordering on the bending line 56 formed in the position possible nearest to the power generation element 57. However, when bending the weld cost 55, as shown in drawing 7 (B), the weld cost 55 is bent from the bending line 56 with the position 58 as the starting point which separated comparatively, and it may become a sealed type cell with low volume efficiency. Structure which serves as a starting point when bending the weld cost 55 is not established, but this problem originates in bending the weld cost 55 and being made even from where, if it puts in another way.

[0007]this invention is made in view of the problem mentioned above, and comes out. The purpose is to provide the sealed type cell which can improve volume efficiency by bending certainly from the position of a request of **.

[0008]

[Means for Solving the Problem]A power generation element in which this invention possesses a separator, a negative electrode, and an anode in order to attain the purpose mentioned above, It is the sealed type cell provided with a package for sealed type cells which carries out accommodation closure of said power generation element, and weld cost which has the prescribed width size provided in a periphery of said package for sealed type cells so that said power generation element might be surrounded, It has the notch part formed along with a longitudinal direction of said weld cost, and is characterized by said notch part not penetrating said weld cost to a thickness direction.

[0009]In a sealed type cell constituted in this way, since a notch part can be used together also as an explosion-proof part, when internal pressure of a package for sealed type cells should rise too much by a surcharge etc., expansion of a package and a burst can be prevented. And in this sealed type cell, by forming a notch part along with a longitudinal direction of weld cost, when bending weld cost, weld cost can be bent along with a notch part. Therefore, in this sealed type cell, if a notch part is beforehand provided in the position possible nearest to a power generation element in weld cost, weld cost will be bent with a notch part as the starting point, and volume efficiency can be improved by this.

[0010]

[Embodiment of the Invention]Hereafter, the embodiment concerning this invention is described in detail based on a drawing. In each embodiment described below, explanation is simplified or omitted by attaching identical codes or considerable numerals in a figure about the member explained in drawing 1.

[0011]As shown in drawing 1, the sealed type cell 10 which is a 1st embodiment concerning this invention, The power generation element 11 possessing the metallic foil which serves as a negative electrode and an anode via a separator, The package 20 for sealed type cells which carries out accommodation closure of the power generation element 11, and the weld cost 25 and 26 which has the prescribed width size W (refer to drawing 3) provided in the periphery of the package 20 for sealed type cells so that the power generation element 11 might be surrounded, It has the notch part 30 formed along with the longitudinal direction of the weld cost 25 and 26, and it is formed so that this notch part 30 may not penetrate the weld cost 25 and 26 to a thickness direction.

[0012]The negative pole terminal 12 and the positive pole terminal 13 are joined to the metallic foil with which the power generation element 11 serves as a negative electrode and an anode, respectively, and these terminals 12 and 13 are projected from the crowning of the power generation element 11. The negative pole terminal 12 and the positive pole terminal 13 are members connected to the terminal of a

portable electronic device, for example.

[0013]The package 20 for sealed type cells consists of the metal resin compound films 21 and 22 which are formed in rectangular shape and continue, The hollow (shown as the seat part 23 corresponding to this hollow) corresponding to the shape of the power generation element 11 is beforehand formed in the metal resin compound film 21, After arranging the power generation element 11 to this seat part 23, use double fold and the power generation element 11 is put so that the metal resin compound films 21 and 22 may be piled up, Heating the three neighborhoods 20A, 20B, and 20C (refer to [drawing 3](#)) of the piled metal resin compound films 21 and 22, make the weld nature resin layer 29 and 29 (shown in [drawing 4](#)) comrades weld, and it is considered as the weld cost 25, 26, and 27, The weld cost 25 and 26 of the both sides of the seat part 23 is bent along the side of the seat part 23 by the notch part 30 (refer to [drawing 3](#)). Thus, by the notch part 30, by being bent towards the side of the seat part 23 like an arrow from the state of [drawing 3](#), the weld cost 25 and 26 of the both sides of the seat part 23 can be in the state of [drawing 1](#), and can raise the volume efficiency of the sealed type cell 10.

[0014]In addition, as shown in [drawing 2](#), the bends 23A and 23B of the seat part 23 are made to meet, and the rear end parts 25A and 26A of the weld cost 25 and 26 bent by the notch part 30 bend, and are formed. Thereby, since it can avoid making the rear end parts 25A and 26A of the weld cost 25 and 26 project, the volume efficiency of the sealed type cell 10 improves more.

[0015]As shown in [drawing 4](#), the metal resin compound films 21 and 22, The protective layer 28 of polyamide resin, such as polyester resin, such as polyethylene terephthalate (PET) along the surface of the metallic foil heartwood 27 made from an aluminum stay, and the metallic foil heartwood 27, and nylon, or the product made of polyimide resin, That by which the weld nature resin layer 29 which has the metal-bonding nature made of polyolefin system resin, such as polypropylene (PP) or polyethylene (PE) along the rear face of the metallic foil heartwood 27, was laminated is used abundantly.

[0016]as shown in [drawing 3](#), the notch part 30 meets the longitudinal direction of the weld cost 25 and 26 near the projection in the protective layer 28 of the metal resin compound film 21 -- perforation form -- or it being formed in the shape of a successive line (not shown), and, And it is formed so that the protective layers 28 and 28 of the weld cost 25 and 26 may not be penetrated to a thickness direction, as shown in [drawing 4](#). Each notch part 30 is formed along the crosswise edge of the weld cost 25 and 26, and if it puts in another way, even if weld nature resin layer 29 comrades between each notch part 30 will have compared and stuck, specifically, it is not welded.

[0017]Even if it forms the notch part 30 in perforation form, and it forms in the shape of a successive line, the same effect is acquired, but the successive line-like notch part 30 is easier to process, and when it improves productivity, it is advantageous. Since the notch part 30 can be formed perforation form and in the shape of a successive line according to the kind of sealed type cell 10, expansion of the scope over the sealed type cell 10 can be aimed at.

[0018]In addition, as shown in [drawing 4](#), the notch part 30 like the metal resin compound film 21, meeting the protective layer 28 of the metal resin compound film 22 at the notch part 30 of one metal resin compound film 21 -- perforation form -- or it is formed so that it may be formed in the shape of a successive line and the protective layer 28 may not be penetrated to a thickness direction.

[0019]This notch part 30 is formed in the section V groove as shown in [drawing 5](#) (A), but it is also possible to form in the notch part 31 of the section KO type shown in [drawing 5](#) (B), and it is also possible to form in the notch part 32 of section curve type shown in [drawing 5](#) (C). A notch part may be

formed in the shape of [other] a section quirk without restricting in the shape of [of drawing 5 (A) - (B)] a section quirk. Thus, the suitable notch part for the various sealed type cells 10 can be suitably chosen by carrying out variety preparation of the shape of a quirk of a notch part.

[0020]When the internal pressure of the package 20 for sealed type cells rises too much in the sealed type cell 10, this notch part 30 works as a safety valve because this notch part 30 splits and the package 20 for sealed type cells cleaves to a line. Under the present circumstances, since weld nature resin layer 29 comrades corresponding to the formation position of each notch part 30 are not welded, to each notch part 30 concerned, the internal pressure of the package 20 for sealed type cells acts directly, and cleaves, and this functions certainly as a safety valve.

[0021]According to the sealed type cell 10, by forming the notch part 30 along with the longitudinal direction of the weld cost 25 and 26, when bending the weld cost 25 and 26, the weld cost 25 and 26 bends along with the notch part 30, respectively. For this reason, it is certainly bendable from the position of a request of the weld cost 25 and 26.

[0022]This invention is not limited to the embodiment mentioned above, and proper modification, improvement, etc. are possible for it, If this invention can be attained, construction material, such as the power generation element illustrated in each embodiment mentioned above, a positive pole terminal, a negative pole terminal, a package for sealed type cells, a metal resin compound film, weld cost, and a notch part, shape, a size, the gestalt, the number, the arrangement part, the width dimension, etc. will be arbitrary, and will not be limited.

[0023]

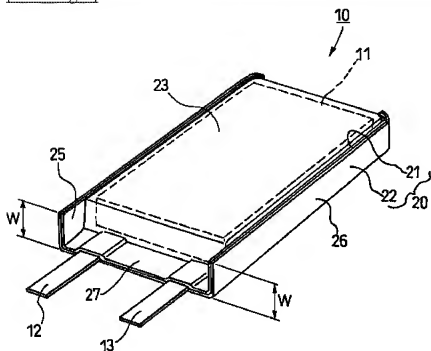
[Effect of the Invention]As mentioned above, since a notch part can be used together also as an explosion-proof part according to this invention as explained, When the internal pressure of the package for sealed type cells rises too much by a surcharge or overdischarge and weld cost is bent by being able to prevent expansion of a package and a burst and forming a notch part along with the longitudinal direction of weld cost, weld cost bends along with a notch part. For this reason, volume efficiency can be improved by bending certainly from the position of a request of weld cost.

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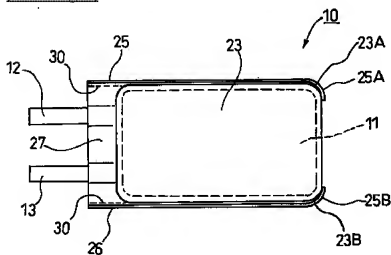
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DRAWINGS

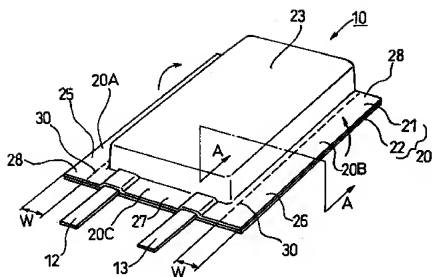
[Drawing 1]



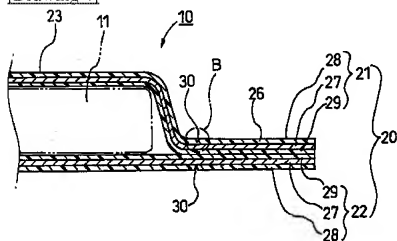
[Drawing 2]



[Drawing 3]

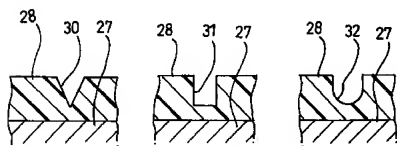


[Drawing 4]

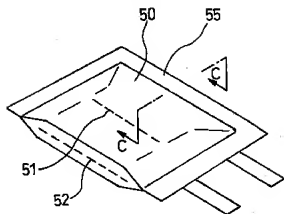


[Drawing 5]

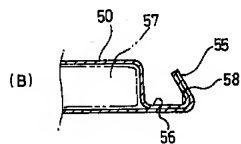
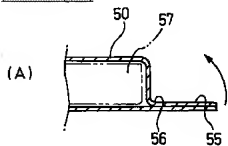
(A) (B) (C)



[Drawing 6]



[Drawing 7]



[Translation done.]